

A.F

Notice of Allowability	Application No.	Applicant(s)	
	10/642,846	SELLERS ET AL.	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/21/2005 & the telephonic interview of 1/23/2006.
2. ☒ The allowed claim(s) is/are 1,3,5-9,12-15 and 17-20.
3. ☒ The drawings filed on 23 December 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>01/23/2006</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with **Attorney Joseph M. Butscher Reg. No. 48,326** on January 23rd 2005 along with authorization to charge any necessary fees to applicant's deposit account. No fees are believed to be due at this time.

3. The application has been amended as follows:

A) Replace claim 1 of the November 21st 2005 amendment and response with the following **Examiner amended claim 1**:

Claim 1 --- A magnetic resonance imaging (MRI) device, comprising:

an inner gradient coil assembly directly adjacent a patient positioning area along the horizontal length of the inner gradient coil assembly;

an outer gradient coil assembly directly adjacent a magnet assembly along the horizontal length of the outer gradient coil assembly; and

a damping layer sandwiched directly between said inner and outer gradient coil assemblies, along the horizontal length of the inner and outer gradient coil assemblies, said damping layer **comprising** at least two vertically separated non-contacting viscoelastic layers, with each viscoelastic layer consisting of at least one of foam or rubber, and at least one high modulus cylinder sandwiched between said two vertically separated non-contacting viscoelastic layers. ---

B) Replace claim 12 of the November 21st 2005 amendment and response with the following **Examiner amended claim 12**:

Claim 12 --- The method of **claim 9**, wherein the high modulus cylinder is at least one of ceramic, glass filament wound tube, and carbon fiber. ---

C) Cancel claim 16.

The following is an examiner's statement of **Reasons for Allowance**:

4. With respect to **Examiner Amended claim 1** and **independent claims 9 and 14** of the **November 21st 2005** amendment and response, these claims are allowable over the **prior art of record** because the **prior art of record** does not disclose or suggest an MRI device/method comprising "A magnetic resonance imaging (MRI) device, (i.e. **claims 1 and 14**), or a method of manufacturing a magnetic resonance imaging (MRI) device, (i.e. **claim 9**) comprising: an inner / first gradient coil assembly directly adjacent a patient positioning area along the horizontal length of the inner gradient coil assembly; an outer / second gradient coil assembly directly adjacent a magnet assembly along the horizontal length of the outer gradient coil assembly; and a damping layer sandwiched directly between said inner and outer gradient coil assemblies, along the horizontal length of the inner and outer gradient coil assemblies, said damping layer comprising at least two vertically separated non-contacting viscoelastic layers, with each viscoelastic layer **consisting of** at least one of foam or rubber, and at least one high modulus cylinder sandwiched between said two vertically separated non-contacting viscoelastic layers". The examiner notes that the amendments to the claims, made by applicant in the November 21st 2005 amendment and response are free of new matter, and do not constitute new matter because the amendments are clear recitations of what is actually shown in applicant's originally disclosed figures, with respect to the location and relationship of the shown and illustrated components.
5. Additionally, the examiner amendments made to claim 1, inserting the word "comprising" which was reinserted to correct a grammatical error, and the amendment of claim 12, to correct the dependency, because a pending claim may not depend from a canceled claim, were merely formal matter corrections.
6. It is the entire combination of the claim limitations, in each of the independent claims taken as a whole, and the "consisting of" limitation, which prevents the viscoelastic-damping layer from including any other component aside from foam, rubber, or a combination of foam/rubber that constitutes both the novelty and non-obviousness of applicant's claims.

7. In the prior arts of record such as **Edelstein et al.**, the viscoelastic damping layer has more components than just at least one of foam or rubber, (i.e. **Edelstein et al.**, has concrete as well). In the other prior arts the damping layers are not located positionally as set forth in applicant's claims. Therefore the location of the components and the specific language of "consisting of" make each of applicant's **examiner amended after-final independent claims 1, 9, and 14** allowable over the **prior arts of record**.

8. **Claims 3, 5-8, 12, 13, 15, and 17-20** are considered to be allowable by the examiner because they each depend from an allowable independent claim.

9. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner's Comment

Drawings

10. The Formal drawings submitted December 23rd 2003 have been approved by the official draftsman and are acceptable to the examiner.

Canceled Claims

11. **Claims 4, 11, and 16** were canceled as per applicant's April 8th 2005 response, which amends the independent claims to include the canceled limitation. Applicant's November 21st 2005 amendment and response incorrectly identifies **claim 16** as "original" when **claim 16** is actually is a canceled claim.

12. The examiner has listed claim 16 in the Examiner's Amendment above as canceled in order to clear up any remaining ambiguity since **claim 16 is a canceled claim from the applicant's April 8th 2005 response**.

13. **Claims 2, 4, 10, 11, and 16** are currently canceled as per applicant's November 21st 2005 amendment and response.

Response to Arguments

14. The examiner has considered applicant's **July 11th 2005 and November 21st 2005** arguments / comments on currently pending **claims 1, 3, 5-9, 12-15, and 17-20**.

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15. The examiner agrees with applicant's arguments found on page 7 paragraph 2 and pages 8 through 10 of the July 11th 2005 response that:

"The Applicants note that the transitional phrase "consisting of" excludes any element, step, or ingredient not specified in the claim." See MPEP at 2111.03. The Applicants also note that the limitation "consisting of at least one of foam or rubber," means foam (only foam, but still "at least one of foam or rubber"), rubber (only rubber, but still "at least one of foam or rubber"), or a combination of foam and rubber (which is still "at least one of foam or rubber", because it includes both)." The Applicants have amended these claims to conform to the suggestions made by the Examiner. [See page 7 paragraph 2 of the July 11th 2005 After-final response.]

Edelstein relates to a gradient coil assembly with an annular space" between inner and outer gradient coil windings "filled with a filler material and, more particularly, to a concrete filler material comprising cement and a selected aggregate material." **Edelstein** at column 1, lines 6-13.

Edelstein discloses a system in which a "concrete material, preferably a conglomerate of Portland cement and one or more selected aggregates, affords more effective suppression of vibration and noise." *Id.* at column 3, lines 9-13."Alternatively, a concrete cylinder with a hollow annulus, i.e., a cylindrical concrete sleeve" may be used. *Id.* at column 3, lines 18-25.

Edelstein, however, does not teach, nor suggest, a "damping layer comprising at least one separate viscoelastic layer consisting of at least one of foam or rubber," as recited in claim 1, as amended. While **Edelstein** discloses concrete layers, and even layers of material that are a mixture of concrete and other materials, **Edelstein** does not teach separate layers composed of foam and/or rubber.

Edelstein discloses a layer of concrete. See *id.* at column 4, lines 62-64 ("As shown in FIG. 3, concrete 26 is then poured into cylindrical space 13 from a nozzle 28, filling the space completely."). **Edelstein** also discloses a hollow concrete cylinder. See *id.* at column 5, lines 42- 45 ("A concrete cylinder 36, of a hollow .cylindrical, or annular, construction and of appropriate inner and outer diameters, is disposed coaxially into cylindrical space 13.. .").

Additionally, **Edelstein** discloses that various materials may be added to the concrete, thereby forming a single concrete filler having additional materials mixed throughout.

The concrete filler can be made in many sizes and forms, and also of many different compositions, to optimize its properties as a filler for the present purposes. Generally, concrete (i.e., "conventional" or "standard" concrete) consists of Portland cement and an aggregate. The aggregate may comprise a selected one, or combination, of materials having lower density than Portland cement, such as expanded shale, fly ash and pumice that reduce the weight, but have minimal adverse impact on the strength and stiffness of the concrete, compared to normal (i.e., higher density) concrete. Also, foam can be introduced into the concrete to make it lighter in weight. Fibers, such as glass, fiberglass, carbon fiber and plastic fibers, can be included to increase tensile strength. which

is important since concrete cylinders 36 employed in the second and third embodiments of the invention have relatively thin annular walls compared, for example, to the annular wall thickness of poured concrete cylinder 26 in the first embodiment of FIGS. 1-4. . . . One preferred embodiment, with beneficial results was obtained using a concrete made of cement with pumice aggregate and a water-latex solution.

Id. at column 7, lines 28-52 (emphasis added). As clearly shown above, **Edelstein** discloses a concrete layer that may be formed **as a mixture of concrete and other materials, such as foam or a water-latex solution**. As such, **Edelstein** discloses a layer that includes concrete and other materials throughout. **Edelstein**, however, does not teach, nor suggest, a "separate viscoelastic layer consisting of at least one of foam or rubber." Instead, **Edelstein's** "filler" includes concrete and may include additional materials, as well. That is, **Edelstein** does not teach, nor suggest, a "damping layer comprising at least one separate viscoelastic layer consisting of at least one of foam or rubber." Thus, at least for this reason, the Applicants respectfully submit that **Edelstein** does not anticipate or render unpatentable **claims 1, 9, 14**, or the claims that depend therefrom." [See page 8 through page 10 of the July 11th 2005 response.]

16. The applicant's comments presented in the November 21st 2005 response have been considered and are considered to be of record by the examiner.

17. The examiner also notes for the record that because **Edelstein et al.**, is **available as prior art only under 102(e)** and that **Edelstein et al.**, reference was **commonly owned / assigned to the General Electric (GE) company/corporation** at the time that the invention was made. Therefore the **Edelstein et al.**, reference is **not available as prior art under 35 USC 103(a)**.

Prior Art of Record

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) Feenan US patent 6,492,816 B1 issued December 10th 2002, with an effective US date of June 7th 2001.

B) Dachniwskyj et al., 5,570,021 issued October 29th 1996. [This is the prior art referred to by **Edelstein et al.**, which has epoxy between each inner and outer corresponding gradient coil set]. The examiner notes that epoxy is not viscoelastic and is different than the requirement that the viscoelastic layer be entirely foam, rubber, or foam/rubber.]

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C) **Petropoulos** US patent 6,011,394 issued January 4th 2000, filed August 7th 1997.

D) **Hirata** US patent 4,594,781 issued September 4th 1990. This reference does not have the viscoelastic layer located between two separate first/second or inner/outer gradient coil assemblies as required by applicant's claims. The x, y, z, gradient coils taken together constitute a first gradient assembly. **Hirata** does not have **two separate first/second or inner/outer** gradient coil assemblies. In order to have two gradient assemblies, **Hirata** would necessarily have to have two separate sets of x, y, z, gradient coils. **Hirata** only has one set of x, y, z, gradient coils. Additionally when the location of the viscoelastic layer(s) of **Hirata** are compared to applicant's claims, the location / position of the viscoelastic component is not located where required in each of applicant's independent claims.

E) **Edelstein et al.**, 6,441,614 B1 issued August 27th 2002, filed December 2nd 1999. This reference fails to overcome applicant's amended independent claims, because **Edelstein et al.**'s damping layer also has cement present, and applicant's after-final amended claims require that the viscoelastic damping layer is "consisting of at least one of foam or rubber" which includes within its scope only the possibilities of foam, rubber, or foam and rubber together. The use of cement by **Edelstein et al.**, eliminates this reference from being prior art against the claims of the instant application. Not available under 35 USC 103(a) because it was commonly owned / assigned at the time the invention was made.

F) **Feenan** PCT publication WO 01/25808 A1 published 12 April 2001.

G) **Feenan** US patent application Publication 2005/0134269A1 published June 23rd 2005, filed January 21st 2004, with a GB priority of December 22nd 2003. This application is not available as prior art because **applicant has an earlier effective US filing and priority date of August 18th 2003.**

H) ***Dietz et al.**, US patent application publication 2001/0008516 A1 published January 24th 2002, filed July 3rd 2001.

I) **Edelstein et al.**, US patent 6,437,568 B1 issued August 20th 2002, filed October 2nd 2000.

J) ***Takeshi et al.**, JP patent **1303140** published December 7th 1989.

K) ***Minas** US patent 6,456,074 issued September 24th 2002, filed January 28th 2000.

L) **Feenan** US patent **6940281** issued September 6th 2005 filed January 21st 2004, with a GB priority of December 22nd 2003. This application is **not available as prior art**

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because applicant has an earlier effective US filing and priority date of August 18th 2003.

M) See additionally all of the examiner's citations of the PTO form 892 attached to the office action of September 16th 2004, as each reference noted is pertinent to the claims of the instant application.

Courtesy Copy of the Currently Allowed and Canceled claims

Claim 1 --- A magnetic resonance imaging (MRI) device, comprising:
an inner gradient coil assembly directly adjacent a patient positioning area along the horizontal length of the inner gradient coil assembly;
an outer gradient coil assembly directly adjacent a magnet assembly along the horizontal length of the outer gradient coil assembly; and
a damping layer sandwiched directly between said inner and outer gradient coil assemblies, along the horizontal length of the inner and outer gradient coil assemblies, said damping layer **comprising** at least two vertically separated non-contacting viscoelastic layers, with each viscoelastic layer consisting of at least one of foam or rubber, and at least one high modulus cylinder sandwiched between said two vertically separated non-contacting viscoelastic layers. ---

Claim 2 (canceled).

Claim 3 --- The MRI device of **claim 1**, wherein said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, carbon fiber, and another non-conductive material exhibiting a high modulus. ---

Claim 4 (canceled).

Claim 5--- The MRI device of **claim 1**, further comprising at least one additional damping layer consisting of at least one of foam or rubber positioned between said outer gradient coil assembly and said magnet assembly, along the horizontal length of the outer gradient coil assembly and said magnet assembly. ---

Claim 6 --- The MRI device of **claim 1**, further comprising at least one additional damping layer consisting of at least one of foam or rubber positioned between said inner gradient coil assembly and said patient positioning area, along the horizontal length of the inner gradient coil assembly and said patient positioning area. ---

Claim 7 --- The MRI device of **claim 1**, wherein said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two vertically separated non-contacting viscoelastic layers consisting of at least one of foam or rubber. ---

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Claim 8 --- The MRI device of **claim 1**, wherein said inner gradient coil assembly generates a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly; and wherein said outer gradient coil assembly shields the magnetic field gradient generated by said inner gradient coil assembly from radiating outwardly from the MRI device. ---

Claim 9 --- A method of manufacturing a magnetic resonance imaging (MRI) device, comprising:

forming a space between a first gradient coil assembly and a second gradient coil assembly;

positioning at least one high modulus cylinder in the space before pouring a liquid viscoelastic material consisting of at least one of foam or rubber into the space;

allowing the liquid viscoelastic material to solidify within the space in order to form a vertically separated damping layer along the horizontal length of the space between the first gradient coil assembly and the second gradient coil assembly, with the damping layer comprising at least one high modulus cylinder sandwiched between at least two vertically separated non-contacting viscoelastic layers, with each viscoelastic layer consisting of at least one of foam or rubber. ---

Claim 10 (canceled).

Claim 11 (canceled).

Claim 12 --- The method of **claim 9**, wherein the high modulus cylinder is at least one of ceramic, glass filament wound tube, and carbon fiber. ---

Claim 13 --- The method of **claim 9**, further comprising positioning plurality of high modulus cylinders before the pouring step in the space such that each of the plurality of high modulus cylinder does not directly contact another high modulus cylinder, the first gradient coil, and the second gradient coil. ---

Claim 14 --- A magnetic resonance imaging (MRI) device, comprising:

a magnet assembly configured to generate a magnetic field;

a patient positioning area;

a first gradient coil assembly directly adjacent said patient positioning area, along the length of the first gradient coil assembly, configured to produce a magnetic field gradient in response to the presence of a magnetic field generated by said magnet assembly;

a second gradient coil assembly directly adjacent said magnet assembly, along the length of the first gradient coil assembly, configured to block the magnetic field gradient generated by said first gradient coil assembly from radiating outwardly from the MRI device; and

a damping layer sandwiched between said first and second gradient coil assemblies, along the length of the inner and outer gradient coil assemblies, wherein

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said damping layer comprises at least one high modulus cylinder sandwiched between two vertically separated non-contacting viscoelastic layers consisting of at least one of foam or rubber. ---

Claim 15 --- The MRI device of **claim 14**, wherein said high modulus cylinder is composed of at least one of ceramic, glass filament wound tube, and carbon fiber. ---

Claim 16 (canceled).

Claim 17 --- The MRI device of **claim 14**, further comprising at least one additional damping layer consisting of at least one foam or rubber positioned between said second gradient coil assembly and said magnet assembly, along the horizontal length of the outer gradient coil assembly and said magnet assembly. ---

Claim 18 --- The MRI device of **claim 14**, further comprising at least one additional damping layer consisting of at least one of foam or rubber positioned between said first gradient coil assembly and said patient positioning area, along the horizontal length of the inner gradient coil assembly and said patient positioning area. ---

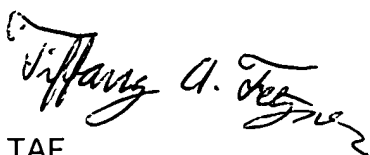
Claim 19 --- The MRI device of **claim 14**, wherein said damping layer comprises a plurality of high modulus cylinders, and wherein each of said plurality of high modulus cylinders is positioned between at least two vertically separated non-contacting viscoelastic layers consisting of at least one of foam or rubber. ---

Claim 20 --- The MRI device of **claim 14**, further comprising a radiofrequency (RF) coil assembly configured to transmit a radiofrequency pulse and detect a plurality of MR signals induced from a subject being imaged. ---
.....

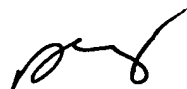
Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is (571) 273-8300.



TAF
January 23, 2006



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800